IN THE CLAIMS

1. (Canceled)

2. (Currently Amended) A method according to claim ~~1~~42, wherein ~~determining a~~ selecting said plurality of points comprises generating a discrete model of said physical space.

3. (Currently Amended) A method according to claim ~~1~~42, wherein the ~~accumulated~~ path cost at the target point approximates a minimal ~~accumulated~~ path cost of a path from the start point to the target point in the physical space.

4. (Currently Amended) A method according to claim ~~1~~3, wherein the minimal path determined ~~is made of~~ includes line segments ~~and each line segment connects~~ which connect two of said group of selected points.

5. (Original) A method according to claim 4, wherein the minimal path cost has a lower or equal cost than any zigzag path from the start point to the target point, wherein the zigzag path connects a plurality of said points, only by straight line segments.

6. (Currently Amended) A method according to claim ~~1~~42, wherein the minimal path determined is a continuous smooth line.

7. (Currently Amended) A method according to claim ~~1~~42, comprising repeatedly updating the ~~accumulated~~ path costs until a stopping criteria is satisfied.

8. (Currently Amended) A method according to claim ~~1~~7, wherein selecting said group of ~~additional~~ points for further consideration is done iteratively based on said computed path costs; and (f) is repeated for said iteratively selected points.

9. (Currently Amended) A method according to claim ~~1~~42, wherein the ~~accumulated~~ path cost of a point is a function of a local cost of the point and ~~an accumulated~~ a calculated path cost of at least one neighbor point of the point.

10. (Currently Amended) A method according to claim ~~1~~42, wherein computing said ~~accumulated~~ path ~~cost~~ costs comprises solving an Eikonal equation.

11. (Original) A method according to claim 10, wherein solving comprises employing a finite-difference approximation to an Eikonal equation.

12. (Previously Presented) A method according to claim 10 wherein computing said accumulated path cost at a point p is carried out by solving an Eikonal equation ||gradient(U(p))|| = L(p), where U(p) is an accumulated path cost function, L(p) is a local cost function, || || is a norm, and where the condition L(p)>0 holds.

13. (Currently Amended) A method according to claim ~~11~~18 wherein computing said ~~accumulated~~ path cost (u) at a point P, in a three dimensional grid, is carried out by solving the equation:

$$L^2 = \max\left(u - U_{x-1,y,z}, u - U_{x+1,y,z}, 0\right)^2 + \max\left(u - U_{x,y-1,z}, u - U_{x,y+1,z}, 0\right)^2 + \max\left(u - U_{x,y,z-1}, u - U_{x,y,z+1}, 0\right)^2$$

where L is the local cost and the U's are accumulated path costs for neighbors of P.

14. (Currently Amended) A method according to claim ~~1~~42, wherein computing said ~~accumulated~~ path cost is carried out using cost calculations suitable for a fast marching method.

15. (Currently Amended) A method according to claim ~~1~~2, wherein the plurality of points and the selected group of points are on a regular grid.

16. (Canceled)

17. (Currently Amended) A method according to claim ~~1~~15, wherein said computing using a cost function comprises computing the cost function for grid points in a particular order.

18. (Currently Amended) A method according to claim~~ 15~~17, wherein selected group of points are neighbors of other ~~a~~ ~~point ~~points located at ~~are ~~one or more adjacent grid points~~ to the point~~.

19. (Canceled)

20. (Currently Amended) A method according to claim ~~1~~2, wherein the points are arranged as a graph.

21. (Currently Amended) A method according to claim ~~1~~18, wherein said points are on a grid, and are located at a certain distance or at a certain radius from the point.

22. (Currently Amended) A method according to claim ~~1~~42, wherein determining a path is carried out by a gradient descent method applied on said plurality of points and said selected group of points.~~ for which an estimated cost to target from a point to the target point is calculated.~~

23. (Currently Amended) A method according to claim 7~~1~~, wherein said estimated-cost-to-target computation is adjusted by deceasing the computed value for use in determination of the minimal path or minimal path cost.

24. (Currently Amended) A method according to claim ~~1~~7, wherein said estimated cost to target computation is adjusted by increasing the computed value for use in determination of the minimal path or minimal path cost.

25. (Currently Amended) A method according to claim 7~~1~~, wherein said estimated cost to target is based on a Euclidian distance to said target.

26. (Currently Amended) A method according to claim ~~1~~7, wherein a collection data structure is used for obtaining a point with the smallest cost, wherein adding or removing a

value from the collection, and reordering the collection has a computational cost of order O(log M) or better, where M is the number of points in the collection.

27. (Original) A method according to claim 26, wherein a heap-type data structure is used for obtaining a point with the smallest cost.

28. (Currently Amended) A method according to claim ~~1~~7, wherein points are categorized and points of different categories are processed differently.

29. (Currently Amended) A method according claim 7~~1~~, wherein costs of at least one point are updated after an initial calculation.

30. (Currently Amended) A method according to claim 7~~1~~, wherein costs of no points are updated after an initial calculation.

31. (Currently Amended) A method according to claim ~~1~~7, wherein the estimated cost-to-target computation is applied to less than all the points for which the ~~accumulated~~ path cost has been computed.

32. (Currently Amended) A method according to claim 7~~1~~, wherein the estimated cost-to-target computation is applied first for the points for which the ~~accumulated~~ path cost is lowest.

33. (Previously Presented) A method according to claim 32, wherein said estimated cost-to-target computation is applied to 40% or less of the points for which the ~~accumulated~~ path cost has been computed.

34. (New) A method according to claim 7, wherein use of said estimated cost to target minimizes computation time for a path that is an acceptable estimate of a minimum path cost from said start point to said target point.

35. (New) A method according to claim 7, wherein the locations of said points are not limited by a set of predetermined alternative routes.

36. (New) A method according to claim 7, wherein said total path cost is the calculated cost from the start point to the points comprised in said selected group of points plus the estimated cost from said intermediate point to said end point.

37. (New) A method according to claim 7, wherein said path is determined from medical image data and represents a path or a centerline along a blood vessel or other lumen in a body.

38. (New) A method according to claim 42, wherein selecting said group of points for further consideration is done iteratively based on said computed path costs; and (f) is repeated for said iteratively selected points.

39. (New) A method according to claim 7, wherein selecting said plurality of points comprises generating a discrete model of said physical space.

40. (New) A method according to claim 8, wherein selecting said plurality of points comprises generating a discrete model of said physical space.

41. (New) A method according to claim 22, wherein said gradient descent method is applied by:

(h) working backward from the target point to find a neighboring one of the selected group of points which has the lowest calculated cost;

(i) repeating (h) for points which are neighbors of the point determined in (h) to find the next lowest cost point;

(j) continuing iterations of (i) until a point is reached which has a total cost of zero; and

(k) stopping the iteration of (i) and recognizing the point having a total cost of as the start point.

42. (New) A method of finding a path from a start point to a target point, in a physical space, wherein a substantially infinite number of paths exist in the space between the start point and the target point, the method comprising:

(a) selecting a plurality of points in the physical space from among the points comprised in said substantially infinite number of possible paths;

(b) computing, using a programmed general purpose computer and a cost function, a path cost from the start point to one of said plurality of points; said path cost representing an estimate of a minimal cost path from the start point to the one point which is acceptably accurate with respect to an optimization criterion;

(c) repeating (b) for a succession of others of said plurality of points to determine the path cost from the start point to each of said succession of other intermediate points;

d) computing estimated costs to target from the plurality of points for which path costs were determined in (b) and (c);

(e) selecting a group of points for further consideration according to those points determined in (b) and (c);

(f) repeating (b)-(e) to determine estimated total path costs to target for said selected group of points; and

(g) after computing said costs, determining, using said computer, at least one of a minimal path or a minimal path cost of a path from the start point to the target point in the physical space, wherein the determination is based on said estimated total path costs and is an acceptably accurate estimate of the lowest cost path with respect to an optimization criterion.

43. (New) The method of claim 42, wherein the estimated total path costs to target is based on approximated total path cost for said selected group of points, where a total path cost is a function of the calculated costs from the start point to the points of said group of points and the estimated costs for said selected group of points to said target point.

44. (New) The method of claim 43, wherein the path cost at the target point approximates a minimal path cost of a path from the start point to the target point in the physical space.